Head Lice: Diagnosis, Treatment and Prevention

ACTIVITY DESCRIPTION
Head lice is a common occurrence in school age children. It can be very distressing for families who turn to their healthcare providers for information, guidance, and treatment. This activity will review the identification, management and prevention of head lice, including new pharmacologic treatment options.

TARGET AUDIENCE
The target audience for this activity is pharmacists, pharmacy technicians, and nurses in hospital, community, and retail pharmacy settings.

LEARNING OBJECTIVES
After completing this activity, the pharmacist will be able to:
- Outline the etiology and epidemiology of head lice infestation
- Describe the over-the-counter (OTC) and prescription treatments for head lice
- Identify prevention strategies
- Identify the role of pharmacists and nurses in counseling, educating, and monitoring patients with head lice

After completing this activity, the pharmacy technicians will be able to:
- Describe the etiology of head lice infestations
- Outline current treatment options for head lice
- Identify prevention strategies for head lice infestations

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Pharmacist Objectives

1. Outline the etiology and epidemiology of head lice infestation
2. Describe the over-the-counter (OTC) and prescription treatments for head lice
3. Identify prevention strategies
4. Identify the role of pharmacists and nurses in counseling, educating, and monitoring patients with head lice
Pharmacy Technician Objectives

1. Describe the etiology of head lice infestations
2. Outline current treatment options for head lice
3. Identify prevention strategies for head lice infestations

Epidemiology

• Infestations occur worldwide
• 6 to 12 million infestations occur annually in the U.S.
• Highest rates occur in children 3 to 11 years of age
• Girls > boys
• African Americans less often affected
Epidemiology

- Do not transmit disease
- Not a reflection of cleanliness
- Not associated with lower socioeconomic status

Cost

- Pharmacotherapy: $240 million per year
- Direct and indirect costs $1 billion per year
- 12 million to 24 million lost school days per year
- Social costs also high
Transmission

- Direct contact with hair of an infested person
- Less likely to occur with sharing items
- Cannot fly or jump

Louse (*Pediculus humanus capitis*)

- Ectoparasite
- Reside close to the scalp to maintain its body temperature
- Life cycle has three stages: egg, nymph and adult
Eggs (aka. Nits)

• Laid by adult female at the base of the hair shaft near the scalp
• Cemented to the hair shaft
• Oval shaped and very small
• Yellow or white in color

Nymph

• Nits hatch in 8-9 days
• Immature louse that hatches from the nit
• Must feed on blood to live
• Mature into adults 9-12 days after hatching
Adult

- Size of a sesame seed
- Tan or grayish-white in color
- Life span approximately 30 days
- Die within 1-2 days if falls off
- Females can lay up to 10 eggs each day

Signs and Symptoms

- Pruritus
- Tickling feeling on scalp
- Irritability and difficulty sleeping
- Excoriations
- Lymph node enlargement
Diagnosis

- Gold Standard = Direct visualization
  - Nape of neck, behind ears
- Combing >3 times more effective
  - Nit comb-teeth <0.3mm apart
  - Comb entire head twice
  - Vinegar can loosen nits
- Eggs NOT diagnostic of infestation
  - Viable if <1cm from scalp

Treatment: General Guidelines

- Examine and treat household/close contacts if infected
- Bedmates should be treated at same time
- Prophylaxis of noninfested individuals NOT needed
- Pets do NOT harbor lice
- Do not treat without confirmation of infestation
Adjunct Treatment Measures

- Hats, scarves, bedding, towels should be machine washed and dried on the hot water and hot air cycles
- Seal other items in plastic bag for 2 weeks
- Soak combs and brushes in hot water for 5-10 minutes
- Vacuum furniture, mattresses, carpets, car seats
  - Chemical treatments not necessary

Over-the-counter Medications
Pyrethrins

• RID®
• Extracts from the chrysanthemum flower
• Pediculicidal, not ovicidal
• Neurotoxic to lice
• Approximately 20-30% of eggs remain viable after treatment
• Success rate 10-75%

Pyrethrins cont.

• Contraindications:
  • allergy to chrysanthemums or ragweed or sensitivity to the drug class
• Common reactions:
  • irritation, contact dermatitis
  • Rare cases of asthma exacerbations
• No significant drug interactions
• Approved for children 2 years of age and older
• Pregnancy Category C
• Cost $20-25
Pyrethrin Application

• Apply to dry hair
• Apply first behind the ears and the back of the neck
• Work product from roots to the to the ends of the hair
• Allow product on hair for 10 minutes, no longer
• Use warm water to bring to a lather, and then rinse thoroughly
• Towel dry hair
• Comb out lice and nits from hair with nit comb, wet comb daily
• Repeat in 7-9 days

Permethrin

• Nix®
• Synthetic pyrethroid
• Pediculicidal, not ovicidal
• Alters cell membrane function, causing paralysis
• Success rates 45-85%
Permethrin cont.

• Contraindication:
  • allergy to chrysanthemums or ragweed, sensitivity to drug or class
• Side effects:
  • burning, pruritus, erythema, numbness, tingling
• Approved for children 2 months of age and older
• Pregnancy Category B
• Cost $20-25

Permethrin Application

• Wash hair with shampoo, rinse with water
• Towel dry hair so it is damp, not wet
• Shake bottle well, apply behind ears and base of neck first
• Completely saturate the hair and scalp
• Leave on for 10 minutes, but no longer
• Rinse with warm water then towel dry
• Remove nits with nit comb, wet comb daily
• Repeat in 7-9 days if needed
Permethrin/Pyrethrin

- Efficacy rates in the 1980s close to 100%
- Most studied and least toxic
- First line recommendation from American Academy of Pediatrics
- Resistant lice and genetic mutations contribute to decreased efficacy

Prescription Medications
Malathion lotion 0.5%

- Brand Name: Ovide
- Organophosphate cholinesterase inhibitor
  - causes respiratory failure of the louse
- Pediculicidal, partially ovicidal
- Contraindications:
  - Neonates, infants, and hypersensitivity to the drug or class
- Approved for children 6 years of age and older
- Efficacy 90-100%

Malathion cont.

- Side effects:
  - irritation of the skin, scalp, and eyes
  - Second degree burns possible
- Foul odor
- Highly flammable
- Risk of severe respiratory depression if ingested
- Pregnancy Category B
- Systemic absorption unknown, but expected to be less than 10%
- Cost $185
Malathion Application

- Apply to dry hair
- Thoroughly wet the hair and scalp with the lotion
- Wash hands after the application
- Allow hair to dry naturally
- Avoid smoking, hair dryers, curling irons
- Shampoo the hair after 8-12 hours
- Remove nits with nit comb
- Repeat in 7-10 days if live lice still present

Benzyl Alcohol 5%

- Brand Name: Ulesfia
- Obstructs the spiracles and causes the lice to suffocate
- Pediculicidal only, not ovicidal
- No drug interactions
- Efficacy >80%
  - May achieve 100% with 1-2 treatments
Benzyl alcohol cont.

• Side effects:
  • skin and eye irritation, pruritus, transient numbness at application site
• Approved for children 6 months of age and older
• Pregnancy Category B
• Cost $85 and up

Benzyl alcohol application

• Dosing based on hair length
• Apply to dry hair
• Apply to behind ears and the base of the neck
• Massage into hair, ensuring to cover all of scalp and hair
• Leave on for 10 minutes then thoroughly rinse
• May shampoo hair after
• Wash hands after application
• Retreat at 9 days or 3 day cycle (day 1, day 7, day 13-15)
Spinosad 0.9% suspension

- Brand Name: Natroba
- Pediculicidal and ovicidal
- Causes neuronal excitation, leads to paralysis and death of the louse
- Side effects: eye and skin irritation
- No drug interactions
- Efficacy 85%

Spinosad cont.

- Potentially fatal gasping syndrome in neonates
  - CNS depression, metabolic acidosis, gasping respirations
- Approved for use in patients 4 years of age and older
- Pregnancy Category B
- Cost $200
Spinosad Application

• Shake bottle well
• Apply to dry hair
• Completely cover scalp first, then apply out to ends of hair
• Allow to stay on for 10 minutes
• Rinse out with warm water
• Wash hands after application
• Ok to wash hair with shampoo after treatment
• If live lice present after 7 days, need to treat again

Ivermectin 0.5% lotion

• Brand Name: Sklice
• Pediculicidal and ovicidal
• Causes hyperpolarization of cell, leading to paralysis and death
• FDA approved for use in patients 6 months of age and older
• Side effects: eye and scalp irritation, dry skin
• Pregnancy category C
• Efficacy 76%
• Cost $300
Ivermectin Application

- Apply to dry hair
- Completely cover scalp and hair closest to the scalp first
- Rub through hair, completely covering all hair, from scalp to tip
- Use the entire tube
- Allow to sit for 10 minutes, then rinse out using only water
- Wash hands after application
- No combing needed per manufacturer
- Retreat at 7 days if live lice still present

Lindane 1% shampoo

- Brand Name: Kwell
- Organochloride with neurotoxic effects on lice and humans
- Not recommended as first line therapy, should be used with extreme caution
- American Academy of Pediatrics (AAP) no longer recommends its use as a pediculicide
- Pregnancy category C
  - Uncertain teratogenicity, will cross placenta, can be detected in breastmilk
Lindane cont.

- Contraindicated in: infants, children, elderly, persons weighing less than 110 pounds, persons with HIV, seizure disorders, pregnant or nursing women, or persons with open sores where lindane would be applied
- Many drug interactions
- Banned in California
- Black box warning—seizures and death have occurred after use

Lindane cont.

- Available for over 50 years in the U.S.
- Resistance noted worldwide
- Indicated for application time of only 10 minutes
- Single treatment only—re-treatment should be avoided
- Efficacy study in 2002
  - Killed only 2% of live lice at 20 minutes
  - 8% killed at 1 hour
  - After 3 hours only 17% of lice killed

Lindane Application

- Apply to dry hair
- Work thoroughly through hair, paying close attention to the fine hairs at the neck line
- Allow to sit for 4 minutes
- Add small quantities of lather to hair until a good lather forms
- Immediately rinse lather away
- Avoid unnecessary contact of lather with other skin areas
- Most patients need only 1 ounce, may need 2 ounces for extremely long or thick hair

Oral Medication
Trimethoprim-sulfamethoxazole

- Brand Name: Bactrim
- Off label use for head lice
- Postulated to kill symbiotic bacteria in the gut of the louse
- Efficacy up to 93%, increase efficacy combined with permethrin 1%
- Dosing 10mg/kg per day based on trimethoprim component
  - Length of treatment needed unknown

Trimethoprim-sulfamethoxazole cont.

- Pregnancy Category C
- Multiple drug interactions
- Multiple contraindications/cautions
- Adverse reactions common
  - Severe reaction Stevens Johnson Syndrome
Oral Ivermectin

- Brand Name: Stromectol
- Off label use for head lice
- Only pediculicidal
- Adverse reactions
  - Serious: Orthostatic hypotension, tachycardia, seizures, Stevens Johnson Syndrome, toxic epidermal necrolysis, asthma exacerbations, vision loss, conjunctival hemorrhage, hepatitis
  - Common: pruritus, rash, fever, edema, lymphadenopathy, headache, myalgia, dizziness, tachycardia, conjunctivitis, ocular inflammation, liver enzyme elevations, eosinophilia

Oral Ivermectin cont.

- Pregnancy Category C
- Dosing schedules:
  - Single dose 200mcg/kg, second dose 9-10 days later
  - Single dose 400mcg/kg, second dose in 7 days
- Efficacy up to 95%
- Potential CNS toxicity
- Should not be used for children less than 30kg
Alternative Treatments

• Natural products with vast marketing exist
• Few scientific studies exist on these products
• Head shaving effective option
• Flammable products should never be used
• Do not use products intended for animals

Other Topical Treatments

• Cetaphil Cleanser treatment
  • Apply to hair and dry with hair dryer, leave on overnight
  • Weekly for 3 weeks

• Petroleum jelly
  • 30-40 gm massaged through scalp and hair
  • Leave on overnight covered with a shower cap
  • Diligent shampooing necessary for 7-10 days following
  • Occlusive and thought to suffocate the louse

• Mayonnaise, margarine, olive oil, and other oils have all been suggested as occlusive treatments as well
Electronic Devices

• LouseBuster™
  • Portable medical device
  • Approved for > 4 years
  • Applies heat to the head
  • Treatment lasts 30 min
  • Sold only to professionals

• Electric combs
  • Electrocute the louse

“Super Lice”

• Not a different louse
• Resistant to common OTC treatments
• Genetically mutate
• Causes:
  • Over treatment
  • Inappropriate treatment
General Treatment Tips

- Remove clothing
- Apply medicine according to instructions
- Hold wash cloth or towel over eyes during treatment
- May need to apply second bottle if hair is longer than shoulder length
- Do not use combination shampoo/conditioner or conditioner before using lice medicine
- Do not rewash hair for 1-2 days after medicine removed unless specifically stated ok for specific product

General Treatment Tips

- Put on clean clothing after treatment
- If a few live lice present 8-12 hours after treatment, but are moving more slowly than before, do not retreat
- Comb dead and any remaining live lice out of hair with fine toothed nit comb
- If live lice still present at 8-12 hours and still as active, may need to retreat with different medicine
General Treatment Tips

• Nit combs often found in lice medicine packages
• Flea combs made for cats and dogs are also effective
• After treatment, comb with nit comb every 1-2 days to remove nits and lice
• May decrease risk of reinfestation
• Continue to check for 2-3 weeks until all nits and lice gone

Nit Combing

• Use detangling comb to remove knots
• Separate hair into manageable sections and clip
• Work through one section at a time
• Place teeth as close to root as possible
• Pull comb through full length of hair
• Rinse and wipe the comb after each pass
• After all sections complete comb through entire thickness of hair again
• Wash all towels in hot water and soak combs in hot water
Prevention

- Avoid head to head contact during play
- Do not share clothing (such as hats, scarves, etc.)
- Do not share combs, brushes, or towels
- Do not lie on beds, couches, pillows, carpets of infested persons
- Machine wash and dry clothing, bed linens, and other items infested person wore
- Vacuum the floor and furniture where an infested person sat or lay
- Do NOT use fumigant sprays or fogs, not necessary and can be toxic if inhaled

Lice and Schools

- Screening programs not effective
- More effective to provide information to families of all children with educational material on head lice
- Child found with active infestation should NOT be sent home
- Advise child’s parents to treat promptly and properly
- Advise parents of other children in the classroom of infestation and advise them to check at home and treat if necessary
- Child should be allowed to return after proper treatment
- No nit policies should be discouraged
Summary

- Common infestation in pediatric population
- Diagnosis made by visual identification
- Multiple topical treatments available
- Pharmacists play key role in identification and education